CLAIMS

1. Method for depositing at least one layer on at least one substrate in a process chamber, the layer comprising at least two components, at least a first metallic component being vaporized into a carrier gas, in particular a heated carrier gas, by means of a discontinuous injection of a first starting material in the form of a liquid or a first starting material dissolved in a liquid, and at least a second component being supplied as a chemically reactive starting material, characterized in that the starting materials are introduced alternately into the process chamber.

2. Method according to Claim 1 or in particular according thereto, characterized in that the second starting material is a chemically reactive gas or a chemically reactive liquid.

3. Method according to one or more of the preceding claims or in particular according thereto, characterized in that the chemically reactive liquid is vaporized.

4. Method according to one or more of the preceding claims or in particular according thereto, characterized in that the at least two starting materials (3) are injected alternately into a vaporization chamber (4).

5. Method according to one or more of the preceding claims or in particular according thereto, characterized by each starting material (3) being individually associated with a vaporization chamber (4).

6. Method according to one or more of the preceding claims or in particular according thereto, characterized in that the process chamber (2) and optionally also the vaporization chamber (4) is purged with an inert gas (7) or evacuated after each injection.

7. Method according to one or more of the preceding claims or in particular according thereto, characterized in that the carrier gas (7) in the vaporization chamber (4) is saturated with the starting material as a result of the injection of the starting material.

8. Method according to one or more of the preceding claims or in particular according thereto, characterized in that the mass of gas that is brought into the vaporization chamber (4) with each injection pulse is determined by means of the gas admission pressure, the pulse length, the pulse pause or the mass flow.

9. Method according to one or more of the preceding claims or in particular according thereto, characterized in that at least one inert carrier gas (16) is introduced directly into the process chamber (2).

10. Method according to one or more of the preceding claims or in particular according thereto, characterized in that the chemically reactive starting material in gaseous form is introduced into the process chamber directly as a gas (18).

11. Method according to one or more of the preceding claims or in particular according thereto, characterized in that the chemically reactive starting material is an oxygen compound or a nitrogen compound.

12. Method according to one or more of the preceding claims or in particular according thereto, characterized in that the chemically reactive starting material is O_2, O_3, N_2O, H_2O or NH_3.

13. Method according to one or more of the preceding claims or in particular according thereto, characterized in that the process chamber is actively heated and in that the

pressure in the process chamber is below or equal to 100 mbar, 50 mbar, 20 mbar or 10 mbar.

14. Method according to one or more of the preceding claims or in particular according thereto, characterized in that the liquid starting materials or the solid materials or liquids dissolved in a liquid contain one or more of the following metals: Al, Si, Pr, Ge, Ti, Zr, Hf, Y, La, Ce, Nb, Ta, Mo, Bi, Nd, Ba, W or Gd.

15. Method according to one or more of the preceding claims or in particular according thereto, characterized in that the layers are deposited conformally on highly structured structures, particularly three-dimensionally structured substrates.

16. Method according to one or more of the preceding claims or in particular according thereto, characterized in that the deposited layers are insulating, passivating or electrically conducting.

17. Method according to one or more of the preceding claims or in particular according thereto, characterized in that the layers consist of metal oxides, metal nitrides or metals.

18. Method according to one or more of the preceding claims or in particular according thereto, characterized in that the injector nozzles, which can be closed by valves, are set in such a way that nanolaminates, hyperstructures, nucleation layers, mixed oxides and gradient layers are produced.

19. Method according to one or more of the preceding claims or in particular according thereto, characterized in that a number of parallel and/or highly structured substrates are disposed side by side on at least one substrate holder, in particular a rotationally driven substrate holder.

20. Method according to one or more of the preceding claims or in particular according thereto, characterized in that a number of planar and/or highly structured substrates are disposed in the process chamber vertically oriented one above the other and/or horizontally oriented side by side and/or oriented at angles between vertical and horizontal.

21. Apparatus for carrying out the method according to one or more of the preceding claims, with a process chamber (2), having a gas inlet member (15), with which one or more vaporization chambers (4) are associated upstream, which vaporization chambers (4) each have at least one injector unit (5) for discontinuously supplying a liquid (3).